

CPAR UGANDA LTD



Tuberculosis in Uganda

Policy Brief I: Capacity to Diagnose Tuberculosis (TB)

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2017

1. The Rationale

Ms. Norah Owaraga¹ authored this policy brief with supervision from Professor Christopher Garimoi Orach². The brief utilises data from an online survey that was conducted in 2016/2017 by the research and policy advocacy project code named: ***“Tuberculosis: Working to Empower Nations’ Diagnostic Efforts (TWENDE).”*** The two-year TWENDE project (2016 – 2017) is funded by the European & Developing Countries Clinical Trials Partnership (EDCTP) Association, specifically through its EDCTP2 Programme (2016); which programme is supported under Horizon 2020, the European Union’s Framework Programme for Research and Innovation.

The intent of this brief is to highlight Uganda’s capacity to diagnose tuberculosis (TB) as it is revealed by the TWENDE survey. In highlighting Uganda’s capacity to diagnose TB, the brief aims to provoke debate on and of policies that relate to TB management in Uganda. The singular objective of the brief, therefore, is to stimulate debate among Uganda’s general public, its policy makers and its policy implementers.

This brief contextualises findings of the TWENDE survey within the World Health Organisation (WHO) global strategy for TB (2014), code named: ***“The End TB Strategy.”*** The WHO strategy that seemingly resulted from its declaration of TB as a global public health emergency has as its first pillar: ***“Integrated, patient-centred care and prevention.”*** Under its first pillar, the WHO strategy recommends early diagnosis of TB through provision of diagnostic facilities that are equipped with new molecular diagnostic capacity.

The partial analysis of the TWENDE survey that is contained in this brief, therefore, is centred on responses by health practitioners to only three of the 25 questions of the survey as follows:

“In your opinion and on a scale of 1 to 5, where 1 = very low and 5 = sufficient, please rate the capacity in your area of jurisdiction for diagnosis of TB.”

Do any of the Healthcare facilities in your area of jurisdiction which treat TB have the GeneXpert MTB/RIF for diagnosis of TB?”

Do any of the Healthcare facilities in your area of jurisdiction, which treat TB have the Line Probe Assay (Hain test) platform for diagnosis of TB?”

The Molecular Line-Probe Assay is a WHO (2016) approved novel technology for the rapid diagnosis of multidrug-resistant TB (MDR-TB).

GeneXpert TB test machines are powerful and highly sensitive molecular diagnostic machines which, for example, according to findings of a study in India (Sreeraj 2015), can detect five times more cases of drug resistant TB.

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2. Uganda's Capacity to Diagnose TB

The TWENDE survey findings are herein presented in this policy brief organised by Uganda geographic regions and in the form of a comparative analysis that utilises Uganda population statistics, as they are derived from a report by the Uganda Bureau of Statistics (2016) on the 2014 Uganda population census.

2.1. Greater Northern Uganda

The Greater Northern Uganda consists of Karamoja, Acholi, Lango and West Nile sub-regions. The findings of the TWENDE survey confirm that Greater Northern Uganda has significantly low capacity to diagnose TB.

Health personnel working in Greater Northern Uganda who responded to the TWENDE survey rated as low (an average score of 2) the capacity in their area of jurisdiction to diagnose TB.

Responses to the TWENDE survey for 20 districts, representing 67 percent of Greater Northern Uganda, show that none of those 20 districts had Molecular Line-Probe Assay Platforms.

Whereas, the Greater Northern Uganda TWENDE survey respondents indicated presence and usage of GeneXpert TB test machines in their areas of jurisdiction, the machines are few and are not evenly distributed throughout the region. Analysed by sub-region, according to the TWENDE survey results, Karamoja seems the better off in Greater Northern Uganda in terms of the ratio of GeneXpert machines to the population as follows:

- **Karamoja Sub-Region:** Responses for six of the seven districts of Karamoja – Abim, Amudat, Kaabong, Kotido, Nakapiripirit and Napak – indicate a ratio of GeneXpert machines to the population of 1:177,000; meaning that over 884,000 people in the six responding districts of Karamoja are serviced by only five GeneXpert machines.
- **Acholi Sub-Region:** In comparison to Karamoja, Acholi is worse off. Responses for all the seven districts of Acholi – Agago, Amuru, Gulu, Kitgum, Lamwo, Nwoya and Pader – indicate a ratio of GeneXpert machines to the population of 1:300,000; meaning that over 1.5 million people of Acholi are serviced by only five GeneXpert machines. It should be noted that there are districts in Acholi, such as Gulu, which bear the additional burden of hosting refugees fleeing unrest in their home countries, especially from South Sudan.
- **Lango Sub-Region:** Seemingly, Lango is in the worst situation in Greater Northern Uganda. Responses for seven of the eight districts of Lango – Alebtong, Amolatar, Apac, Dokolo, Kole, Otuke and Oyam - indicate a ratio of GeneXpert machines to the population of 1:553,000; meaning that over 1.6 million people of the responding districts of Lango are serviced by only three GeneXpert machines.
- **West Nile Sub-Region:** West Nile covers the districts of Adjumani, Arua, Koboko, Maracha, Moyo, Nebbi, Yumbe and Zombo. At the time of writing this brief, CPAR Uganda Ltd understood that the TWENDE online survey did not receive responses from any of the eight districts of West Nile. Nevertheless, it is feasible to surmise that the situation in West Nile is unlikely to be better than that of the other sub-regions of Greater Northern Uganda. It is, in fact, more likely to be worse off, since, West Nile hosts a significant population of refugees from South Sudan and also from the Democratic Republic of Congo.

2.2. Greater Eastern Uganda

The Greater Eastern Uganda consists of the three sub-regions of Teso, Small East (Bugisu, Bugwere, Samia, Bunyole, Jopadhola) and Busoga sub-regions.

Health personnel working in 28 of the 32 districts of Greater Eastern Uganda who responded to the TWENDE survey rated as above average (an average score of 3) the capacity in their areas of jurisdiction to diagnose TB.

The ratio of GeneXpert machines to the population of the Greater Eastern Uganda, as revealed by the TWENDE survey, however, points to significantly lower capacity in the region to diagnose TB. Overall, the ratio of GeneXpert machines to the population of the responding districts of Greater Eastern Uganda is 1:367,000; meaning that a population of nearly 7.7 million people of the 28 responding districts is served by only 21 GeneXpert machines.

Analysed by sub-region, Busoga is the worse off in Greater Eastern Uganda in terms of the ratio of GeneXpert machines to the population as follows:

- **Busoga Sub-Region:** Covering the districts of Bugiri, Buyende, Iganga, Jinja, Kaliro, Kamuli, Luuka, Mayuge, Namayingo, and Namutumba, Busoga is worse off in capacity to diagnose TB in the Greater Eastern Uganda. The TWENDE survey reveals that Busoga has a ratio of GeneXpert machines to the population of 1:482,000; meaning that a population of nearly 3.4 million people of the 28 responding districts of Busoga is served by only seven GeneXpert machines.
- **Small East Sub-Region:** The Small East covers the districts of Budaka, Bududa, Bukwo, Bulambuli, Busia, Butaleja, Kapchorwa, Kibuku, Kween, Manafwa, Mbale, Sironko, Pallisa, and Tororo. With a ratio of GeneXpert machines to the population of 1:358,000, the Small East is slightly better off than its neighbour, Busoga, in terms of its capacity to diagnose TB. Nevertheless, the TWENDE survey reveals that a population of over 2.5 million people of 11 of the 14 districts of the Small East which responded to the TWENDE survey is seemingly served by only seven GeneXpert machines.
- **Teso Sub-Region:** Of the three sub-regions of the Greater Eastern Uganda, Teso, covering the districts of Amuria, Bukedea, Kaberamaido, Katakwi, Kumi, Ngora, Serere and Soroti, is the better off in terms of capacity to diagnose TB. Responses for all the eight districts of Teso were received and the TWENDE survey results reveal that Teso has a GeneXpert ratio to the population of 1:260,000; meaning that its population of over 1.8 million people is served by seven GeneXpert machines.

The evidently low capacity in Greater Eastern Uganda to diagnose TB is further confirmed by the TWENDE survey results which point to the fact that the region does not have any Molecular Line-Probe Assay technologies. Responses to the TWENDE Survey for 28 districts, which represent 88 percent of Greater Eastern Uganda, show that none of the 28 districts had Molecular Line-Probe Assay platforms.

2.3. Greater Western Uganda

The Greater Western Uganda consists of Ankole, Kigezi, Rwenzori and Bunyoro sub-regions. Health personnel working in 17 of the 26 districts of Greater Western Uganda who responded to the TWENDE survey rated as near sufficient (an average score of 4) the capacity in their area of jurisdiction to diagnose TB.

However, responses to other questions of the same TWENDE survey indicate the ratio of GeneXpert machines to the population of Greater Western Uganda to be 1:405,000; meaning that a population of over 5.6 million of the 17 responding districts is served by only 14 GeneXpert machines.

The seeming insufficient capacity to diagnose TB in Greater Western Uganda is not evenly distributed throughout the region. Analysed by sub-region the distribution is as follows:

- **Bunyoro Sub-Region:** Consisting of the five districts of Buliisa, Hoima, Kibaale, Kiryandongo and Masindi, Bunyoro is seemingly the worse off in Greater Western Uganda. However, it should be noted that only one of the five districts of Bunyoro responded to the TWENDE survey, indicating that it had one GeneXpert machine serving a population of about 574,000 people; thus a ratio of GeneXpert machine to the population of 1:574,000.
- **Rwenzori Sub-Region:** Covering Tooro, Bukhonzon and Bwamba; and consisting of the seven districts of Bundibugyo, Kabarole, Kamwenge, Kasese, Kyegegwa, Kyenjojo and Ntoroko, Rwenzori is seemingly slightly better than Bunyoro within Greater Western Uganda. Rwenzori, nevertheless, has insufficient capacity to diagnose TB. Responses to the TWENDE survey were received from five of the seven districts of Rwenzori, which responses indicate that a population of the responding districts of nearly 1.9 million people is served by four GeneXpert machines; meaning a ratio of GeneXpert machine to the population of 1:473,000.
- **Ankole Sub-Region:** Ankole consists of the 10 districts of Buhweju, Bushenyi, Ibanda, Isingiro, Kiruhura, Mbarara, Mitooma, Ntungamo, Rubirizi, and Sheema. Within the Greater Western Uganda Ankole seems better off than both Rwenzori and Bunyoro, but all in all Ankole also has low capacity to diagnose TB. The TWENDE survey received responses from seven of the 10 districts of Ankole, which responses indicate that the population of the responding districts of over 1.8 million people is served by five GeneXpert machines; thus the ratio of GeneXpert machines to the population is 1:363,000.
- **Kigezi Sub-Region:** While Kigezi, consisting of the four districts of Kabale, Kanungu, Kisoro and Rukungiri, has the better capacity within the Greater Western Uganda to diagnose TB, its capacity is also low. Responses from health personnel in all the four districts that were received by the TWENDE survey indicate that with a population of nearly 1.4 million people, Kigezi is served by four GeneXpert machines; thus a ratio of GeneXpert machines to the population of 1:348,000.

The conclusion that the capacity of Greater Western Uganda to diagnose TB is low is further supported by TWENDE Survey responses for the Greater Western Uganda. None of the 17 responding districts, which represent 65 percent of Greater Western Uganda, has Molecular Line-Probe Assay platforms.

2.4. Greater Central Uganda

Greater Central Uganda is largely the geographic coverage of the Buganda Kingdom; that of the largest first nation of Uganda, the Baganda (Uganda Bureau of Statistics 2016). It is important to note that Central Uganda hosts two metropolises - the Capital City of Uganda, Kampala, and Entebbe in Wakiso District, which hosts the country's only international airport. No wonder, therefore, that Greater Central Uganda is the most populous region of the Country.

Health personnel working in 16 of the 24 districts of Greater Central Uganda who responded to the TWENDE survey rated as near sufficient (an average score of 4) the capacity in their area of jurisdiction to diagnose TB.

The assessment of the responding health workers for Greater Central Uganda that their area of jurisdiction has a near sufficient capacity to diagnose TB is supported by the TWENDE Survey finding that the Greater Central Uganda is the only region in the Country which has Molecular Line-Probe Assay Platforms - specifically, however, only one of the responding districts indicated that it had such technologies.

On the basis of GeneXpert machine coverage, the assessment of near sufficient capacity to diagnose TB seems inconsistent with the Greater Central Region's ratio of GeneXpert machines to the population. The TWENDE survey results indicate the ratio of GeneXpert machines to the population of Greater Central Uganda to be 1:330,000; meaning that a population of over 6.9 million of the 16 responding districts is served by only 21 GenXpert machines.

Central Uganda consists of the two sub-regions of Small Central and South Central. Analysed by sub-region the seemingly insufficient capacity to diagnose TB in Greater Central Uganda, as is revealed by GeneXpert machine coverage, is not evenly distributed throughout the region as follows:

- **South Central Sub-Region:** The 11 districts of Bukomansimbi, Butambala, Gomba, Kalangala, Kalungu, Lwengo, Lyantonde, Masaka, Mpigi, Rakai, and Sembabule constitute South Central Uganda. In comparison, within the Greater Central Uganda, South Central is seemingly the better off. Responses to the TWENDE survey were received from six of the 11 districts of South Central, which responses indicate that a population of the responding districts of over 1.4 million people is served by six GeneXpert machines; meaning a ratio of GeneXpert machine to the population of 1:241,000.
- **Small Central Sub-Region:** Small Central consists of the 13 districts of Buikwe, Buvuma, Kampala, Kayunga, Kiboga, Kyankwanzi, Luwero, Mityana, Mubende, Mukono, Nakaseke, Nakasongola and Wakiso. The TWENDE survey received responses from 10 of the 13 districts of Small Central, which responses indicate that the population of the responding districts of over 5.4 million people is served by 15 GeneXpert machines; thus the ratio of GeneXpert machines to the population is 1:366,000.

2.5. Summary GeneXpert TB Testing Machines Coverage for Uganda

As of 2014/2015 and during the period when the most recent Uganda population census was conducted in 2014, the Country had a total of 112 districts. The TWENDE survey received responses for 81 of those districts. The table which follows provides a summary, by region, of Uganda's population, the population of the 81 responding districts grouped by sub-region, the number of GeneXpert machines in the responding districts grouped by sub-region and ratio of machines to the population.

Regions	Population	Population Responding Districts	Number of Machines	Ratio
Northern	7,230,961	4,054,906	13	1:312,000
Acholi	1,511,614	1,511,614	05	1:300,000
Karamoja	988,729	884,190	05	1:177,000
Lango	2,069,618	1,659,102	03	1:553,000
West Nile	2,661,000	-	-	-
Eastern	9,094,960	7,698,945	21	1:367,000
Busoga	3,609,484	3,372,557	07	1:482,000
Small East	3,665,686	2,506,598	07	1:358,000
Teso	1,819,790	1,819,790	07	1:260,000
Western	8,939,355	5,671,601	14	1:405,000
Ankole	2,918,397	1,812,914	05	1:363,000
Bunyoro	2,037,325	573,903	01	1:574,000
Kigezi	1,393,981	1,393,981	04	1:348,000
Rwenzori	2,589,652	1,890,803	04	1:473,000
Central	9,569,119	6,932,590	21	1:330,000
Small Central	7,240,775	5,485,999	15	1:365,000
South Central	2,328,344	1,446,591	06	1:241,000
Uganda	34,834,395	24,358,042	69	1:353,000

3. Implications and Further Research Questions

Uganda is no longer considered among the TB high burden countries (HBCs), those with a high prevalence rate of TB. According to the WHO (2016), Uganda was removed from the list of the 22 TB HBCs in 2015 alongside Afghanistan, which reduced the number of TB HBCs to 20. However, 10 new countries were added to the list and thus the list of TB HBCs as of 2016 consists of 30 countries and Uganda is not on the list.

Does the change of status for Uganda, no longer being listed among TB HBCs, justify the TWENDE survey finding that only one of the 81 responding districts of Uganda has a Molecular Line-Probe Assay Platform?

In other words, is the prevalence of TB so low in Uganda that, as revealed by the TWENDE survey, 70 percent of the country's population (over 24.3 million people) residing in 81 districts is served by a Molecular Line-Probe Assay Platform that is located in only one district?

Similarly, is the prevalence of TB so low in Uganda that, as revealed by the TWENDE survey, 70 percent of the country's population residing in 81 districts is served by only 69 GeneXpert machines; a ratio of 1:353,000?

The TWENDE survey reveals that Uganda's national ratio for GeneXpert machine to population is 1:353,000.

Does it mean that the TB prevalence rates are lower in the seven sub-regions – Small East (1:358,000), Ankole (1:363,000), Small Central (1:366,000), Rwenzori (1:473,000), Lango (1:553,000), and Bunyoro (1:574,000) – which according to the TWENDE survey have GeneXpert machine to population ratios that are higher than the national average?

Does it mean that the TB prevalence rates are higher in the five sub-regions – Karamoja (1:177,000), South Central (1:241,000), Teso (1:260,000), Acholi (1:300,000), and Kigezi (1:348,000) – which according to the TWENDE survey have GeneXpert machine to population ratios that are lower than the national average?

What determined the regional allocation and location of resources - Molecular Line-Probe Assay Platforms and GeneXpert machines – in and for the different sub-regions and/or districts of Uganda?

Was the allocation and location of diagnostic technologies determined by prevalence of TB?

Or was the allocation and location of diagnostic technologies determined by other factors other than prevalence of TB?

These and many other questions such as these need answering if Uganda is truly going to rid itself of TB; or at the very least slow down its TB infection rate and therefore significantly reduce those that TB afflicts.

4. Further Actions

CPAR Uganda Ltd, as part of its role within the TWENDE Consortium (2016), is interested in questions such as those raised in this policy brief and it plans to actively seek answers for them through empirical research activities with the view of contributing towards positively influencing policy and practice that will contribute towards kicking TB out of Uganda.

For that reason, CPAR Uganda Ltd confirms that this brief is targeted, first, towards the participants of the up-coming TWENDE policy workshops that it plans to hold during the last quarter of 2017, i.e. District Health Officers and District Chairpersons for all the 112 Uganda District Local Governments.

In line with the EDCTP ethos of dissemination of results, in August 2017, prior to the holding of the CPAR Uganda Ltd organised TWENDE policy workshops, CPAR Uganda Ltd will publish this brief in PDF format, online on its website, so that it is accessible worldwide to academics, health practitioners, policy makers, policy implementers, the media, and all other interested persons.

The TWENDE policy workshops that CPAR Uganda Ltd will organise will be conducted through the Government of Uganda's mechanism of District Integrity Forums, which forums are constituted by representatives of Uganda's political leadership, technocrats and civil society organisations.

The CPAR Uganda Ltd organised TWENDE policy workshops will be held under Chatham House Rules (2016) – participants are free to use the information and ideas therein generated, but are not permitted to reveal the identity nor the affiliation of fellow participants.

TWENDE policy workshops are part of the project's qualitative research activities. The other TWENDE qualitative research activities that are being implemented by CPAR Uganda Ltd in Uganda include interviews and focus group discussions with public servants, civil servants, representatives of civil society organisations, private sector health care practitioners, TB patients or survivors, TB patient care givers, among others.

In conjunction with the policy workshops, CPAR Uganda Ltd will hold post workshop press conferences and ensure that the discussions during the press conferences - the interface between the traditional media (journalists from Television, Radio and Print) and panels of leaders (politicians, technocrats and civil society) - are simultaneously shared on social media (Twitter and Face Book), in order to facilitate wider public engagement on issues related with the management of TB in Uganda.

CPAR Uganda Ltd will utilise the qualitative data, i.e. the discussions that this brief shall generate, together with its other TWENDE qualitative data - from interviews, from focus group discussions and from press conferences - in order to author publications which contribute to the body of knowledge on TB in Uganda. In particular, the CPAR Uganda Ltd TWENDE publications will focus on contributing to the achievement of the TWENDE project objectives to:

- Provide valuable knowledge on how research innovation uptake can be accelerated.
- Encourage new research.
- Develop policymaker partnerships.
- Plot appropriate avenues through which local and international funding can make an impact.
- Empower Southern institutions to translate knowledge into policy and practice.

Disclaimer:

This policy brief is among the products of the TWENDE project that is part of the EDCTP2 programme supported by the European Union. Whereas, the EDCTP Association and the European Union provided funding for the TWENDE Project, the views herein expressed are not necessarily those of the EDCTP Association or those of the European Union.

The TWENDE Consortium consists of the following institutions: in Uganda - CPAR Uganda Ltd and Makerere University Kampala; in Tanzania – Kilimanjaro Clinical Research Institute and National Institute for Medical Research – Mbeya Medical Research Centre; in Kenya – the Kenya Medical Research Institute; the East African Health Research Commission of the East African Community; and the University of St. Andrews, United Kingdom (Consortium Coordinator). Whereas, the researcher who authored this report is the Managing Director of CPAR Uganda Ltd, one of the Consortium Partners, the views herein expressed in this report are not necessarily those of CPAR Uganda Ltd or those of the other TWENDE Consortium partner organisations.

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